

STPS30170C

HIGH VOLTAGE POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

I _{F(AV)}	2 x 15 A
V _{RRM}	170 V
T _j	175 °C
V _F (max)	0.75 V

FEATURES AND BENEFITS

- High junction temperature capability
- Low leakage current
- Good trade off between leakage current and forward voltage drop
- Insulated package: TO-220FPAB Insulating voltage: 2000 V DC Capacitance: 45 pF
- Avalanche specification

DESCRIPTION

Dual center tab Schottky rectifier suited for High Frequency Switch Mode Power Supply.

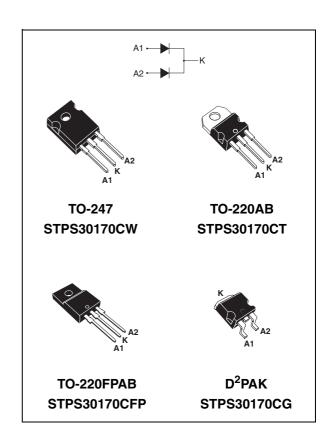


Table 2: Order Codes

Part Numbers	Marking
STPS30170CW	STPS30170CW
STPS30170CT	STPS30170CT
STPS30170CFP	STPS30170CFP
STPS30170CG	STPS30170CG
STPS30170CG-TR	STPS30170CG

Table 3: Absolute Ratings (limiting values, per diode)

Symbol		Value	Unit				
V_{RRM}	Repetitive peak reverse v	oltage			170	V	
I _{F(RMS)}	RMS forward current				30	Α	
		TO-220FPAB	Tc = 120 °C Per diode				
le	Average forward current	TO-220AB /			15	Α	
I _{F(AV)}	$\delta = 0.5$	D ² PAK	Tc = 155 °C			^	
		TO-247		Per device	30		
I _{FSM}	Surge non repetitive forward current tp = 10ms sinusoidal				220	Α	
P _{ARM}	Repetitive peak avalanche power tp = 1µs Tj = 25 °C				10500	W	
T _{stg}	Storage temperature rang	-65 to + 175	°C				
T _j	Maximum operating juncti	175	°C				
dV/dt	Critical rate of rise of reverse voltage 10000					V/µs	

^{*:} $\frac{dPtot}{dTj} > \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

Table 4: Thermal Parameters

Symbol		Parameter			
		TO-220FPAB	Per diode Total	4 3.3	
R _{th(j-c)}	Junction to case	TO-220AB / D ² PAK	Per diode Total	1.6 0.85	°C/W
		TO-247	Per diode Total	1.5 0.8	
		TO-220FPAB	Coupling	2.6	
R _{th(c)}		TO-220AB / D ² PAK	Coupling	0.3	°C/W
		TO-247	Coupling	0.3	

When the diodes 1 and 2 are used simultaneously:

Table 5: Static Electrical Characteristics (per diode)

Symbol	Parameter	Tests conditions		Min.	Тур	Max.	Unit
I _R *	Reverse leakage current	T _j = 25 °C	$V_R = V_{RRM}$			20	μΑ
'H	neverse leakage current	T _j = 125 °C			5	20	mA
	- ** Forward voltage drop	T _j = 25 °C	I _F = 15 A			0.92	
V _F **		T _j = 125 °C			0.69	0.75	V
V F		T _j = 25 °C	I _F = 30 A			1	V
		T _j = 125 °C	IF - 50 A		0.80	0.86	

To evaluate the conduction losses use the following equation: $P = 0.64 \times I_{F(AV)} + 0.0073 I_{F}^{2}(RMS)$

577

 $[\]Delta \; \mathsf{Tj}(\mathsf{diode}\; \mathsf{1}) = \mathsf{P}(\mathsf{diode}\; \mathsf{1}) \; \mathsf{x} \; \mathsf{R}_{th(j-c)}(\mathsf{Per}\; \mathsf{diode}) \; + \; \mathsf{P}(\mathsf{diode}\; \mathsf{2}) \; \mathsf{x} \; \mathsf{R}_{th(c)}$

Figure 1: Average forward power dissipation versus average forward current (per diode)

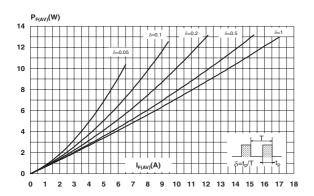


Figure 3: Normalized avalanche power derating versus pulse duration

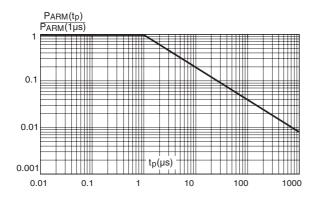


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220AB, TO-247, D²PAK)

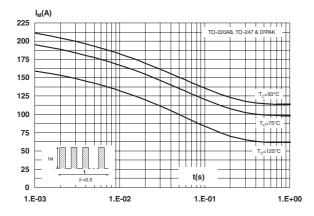


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$, per diode)

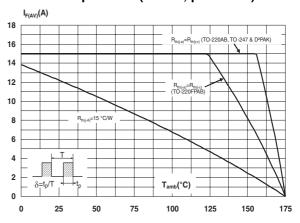


Figure 4: Normalized avalanche power derating versus junction temperature

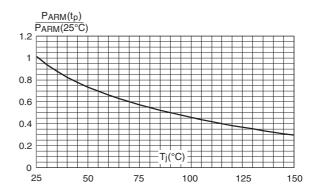


Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values, per diode) (TO-220FPAB)

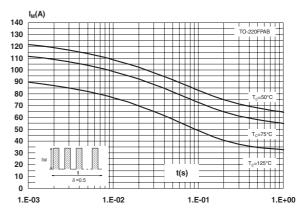


Figure 7: Relative variation of thermal impedance junction to case versus pulse duration (per diode) (TO-220AB, TO-247, D²PAK)

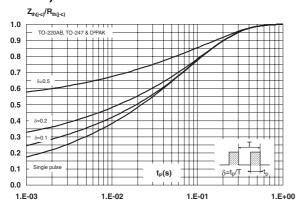


Figure 9: Reverse leakage current versus reverse voltage applied (typical values, per diode)

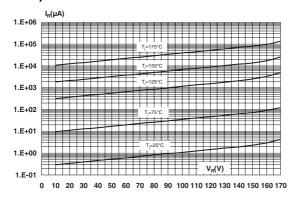


Figure 11: Forward voltage drop versus forward current (maximum values, per diode, low level)

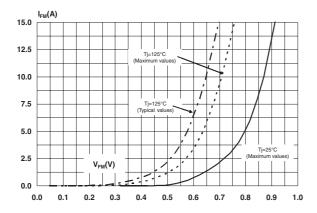


Figure 8: Relative variation of thermal impedance junction to case versus pulse duration (per diode) (TO-220FPAB)

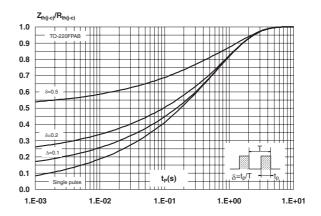


Figure 10: Junction capacitance versus reverse voltage applied (typical values, per diode)

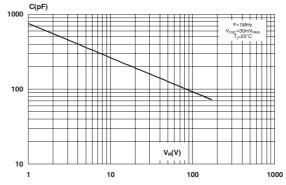
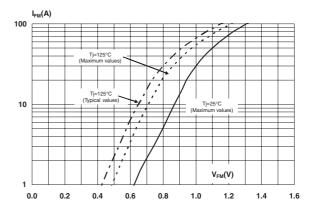


Figure 12: Forward voltage drop versus forward current (maximum values, per diode, high level)



4/9

Figure 13: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board, copper thickness: $35 \mu m$) (D²PAK)

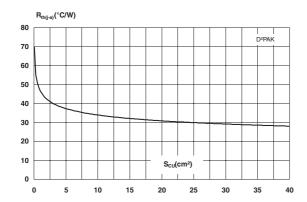
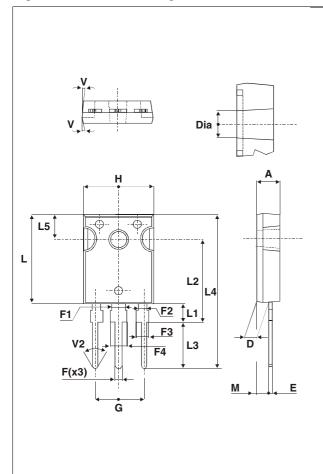
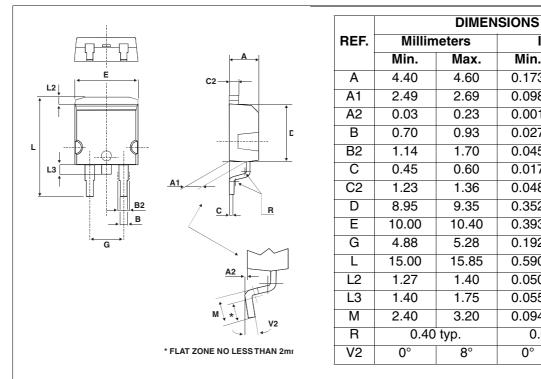


Figure 14: TO-247 Package Mechanical Data



			DIMEN	SIONS		
REF.	Mi	Illimete	rs		Inches	i
•	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	4.85		5.15	0.191		0.203
D	2.20		2.60	0.086		0.102
Е	0.40		0.80	0.015		0.031
F	1.00		1.40	0.039		0.055
F1		3.00			0.118	
F2		2.00			0.078	
F3	2.00		2.40	0.078		0.094
F4	3.00		3.40	0.118		0.133
G		10.90			0.429	
Н	15.45		15.75	0.608		0.620
L	19.85		20.15	0.781		0.793
L1	3.70		4.30	0.145		0.169
L2		18.50			0.728	
L3	14.20		14.80	0.559		0.582
L4		34.60			1.362	
L5		5.50			0.216	
М	2.00		3.00	0.078		0.118
V		5°			5°	
V2		60°			60°	
Dia.	3.55		3.65	0.139		0.143

Figure 15: D²PAK Package Mechanical Data



Inches

Max.

0.181

0.106

0.009

0.037

0.067

0.024 0.054

0.368

0.409

0.208

0.624

0.055

0.069

0.126

8°

Min.

0.173

0.098

0.001

0.027

0.045

0.017

0.048

0.352

0.393

0.192

0.590

0.050

0.055

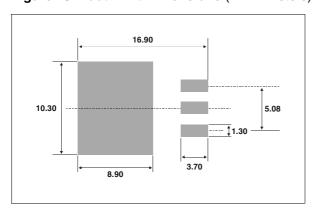
0.094

0°

8°

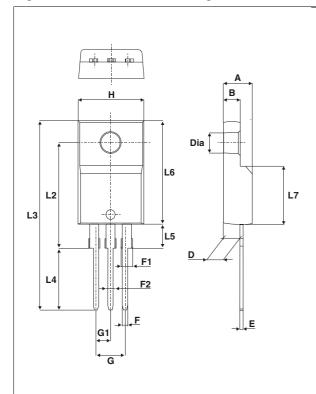
0.016 typ.

Figure 16: Foot Print Dimensions (in millimeters)



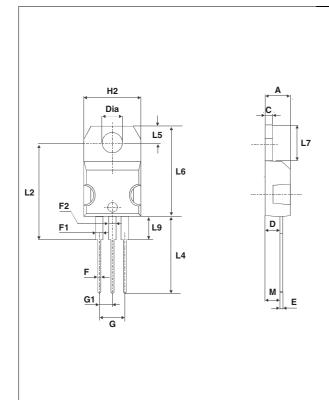
6/9

Figure 17: TO-220FPAB Package Mechanical Data



	DIMENSIONS				
REF.	Millim	neters	Inc	hes	
	Min.	Max.	Min.	Max.	
Α	4.4	4.6	0.173	0.181	
В	2.5	2.7	0.098	0.106	
D	2.5	2.75	0.098	0.108	
Е	0.45	0.70	0.018	0.027	
F	0.75	1	0.030	0.039	
F1	1.15	1.70	0.045	0.067	
F2	1.15	1.70	0.045	0.067	
G	4.95	5.20	0.195	0.205	
G1	2.4	2.7	0.094	0.106	
Н	10	10.4	0.393	0.409	
L2	16	Гур.	0.63 Typ.		
L3	28.6	30.6	1.126	1.205	
L4	9.8	10.6	0.386	0.417	
L5	2.9	3.6	0.114	0.142	
L6	15.9	16.4	0.626	0.646	
L7	9.00	9.30	0.354	0.366	
Dia.	3.00	3.20	0.118	0.126	

Figure 18: TO-220AB Package Mechanical Data



	DIMENSIONS				
REF.	Millin	neters	Inc	hes	
	Min.	Max.	Min.	Max.	
Α	4.40	4.60	0.173	0.181	
С	1.23	1.32	0.048	0.051	
D	2.40	2.72	0.094	0.107	
Е	0.49	0.70	0.019	0.027	
F	0.61	0.88	0.024	0.034	
F1	1.14	1.70	0.044	0.066	
F2	1.14	1.70	0.044	0.066	
G	4.95	5.15	0.194	0.202	
G1	2.40	2.70	0.094	0.106	
H2	10	10.40	0.393	0.409	
L2	16.4	typ.	0.645 typ.		
L4	13	14	0.511	0.551	
L5	2.65	2.95	0.104	0.116	
L6	15.25	15.75	0.600	0.620	
L7	6.20	6.60	0.244	0.259	
L9	3.50	3.93	0.137	0.154	
М	2.6 typ.		0.102	2 typ.	
Diam.	3.75	3.85	0.147	0.151	

STPS30170C

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Table 6: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
STPS30170CW	STPS30170CW	TO-247	4.40 g	30	Tube
STPS30170CT	STPS30170CT	TO-220AB	2 g	50	Tube
STPS30170CFP	STPS30170CFP	TO-220FPAB	1.9 g	50	Tube
STPS30170CG	STPS30170CG	D ² PAK	1.48 g	50	Tube
STPS30170CG-TR	STPS30170CG	DIAK	1.∓0 g	1000	Tape & reel

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)
- TO-220 Recommended torque value: 0.55 Nm, Maximum torque value: 0.7 Nm.
- TO-247 Recommended torque value: 0.8 Nm, Maximum torque value: 1.0 Nm.

Table 7: Revision History

Date	Revision	Description of Changes
16-Sep-2005	1	First issue.

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